

V. REMARKS

Claims 19, 22, 23, 26 and 28 are rejected under 35 U.S.C. 102(e) as anticipated by Zhao et al. (U.S. Patent Application Publication No. 2004/0020601). Claims 19, 20, 22, 23 and 25-28 are rejected under 35 U.S.C. 103(a) as unpatentable over Ouellet (U.S. Patent No. 5,470,798) in view of Livesay et al. (U.S. Patent No. 6,132,814). Claim 21 is rejected under 35 U.S.C. 103(a) as unpatentable over Ouellet and Livesay as applied to claims 19, 20, 22, 23 and 25-28 and further in view of Hattori et al. (U.S. Patent No. 5,489,339). Claims 24 and 29 are rejected under 35 U.S.C. 103(a) as unpatentable over Ouellet and Livesay as applied to claims 19, 20, 22, 23 and 25-28 and further in view of Oh (U.S. Patent Application Publication No. 2003/0154001). The rejections are respectfully traversed.

About claim 19 as amended

According to amended claim 19, in curing the insulating film with electron beams, the irradiation with the electron beams at the curing processing is performed in a low pressure atmosphere, whereby the curing processing of the insulating film can be performed in a very short time and uniformly. In addition, according to the present invention: the pressure in the carrier chamber between the first processing section and the second processing section is reduced to a relatively high pressure, the pressure in the second processing section in which the curing processing unit is housed is reduced to a relatively low pressure, and the pressure in the curing processing unit housed in the second processing section is reduced to a much lower pressure. This ensures that even when the pressure in the curing processing unit is reduced to a very low pressure, the pressures in the carrier chamber, the second processing section, and the curing processing unit are reduced in that order, such that the pressures can be reduced stepwise in order of carriage of the substrate. This prevents the substrate from being carried suddenly into a low pressure atmosphere, thus ensuring that distortion and breakage of the substrate due to change in pressure can be prevented. Furthermore, since the pressure in the second processing section housing the curing processing unit therein is reduced to a low pressure next to that in the curing processing unit, the time required to reduce the pressure in the curing processing unit to a predetermined

pressure every time the substrate is carried in/out can be shortened to shorten the curing processing time and the total time for substrate processing. Further, the difference in pressure in the curing processing unit is decreased, so that the load on the pressure-reducing system in the curing processing unit can also be reduced.

Such effects cannot be obtained in the cited references at all. The point that "the carrier chamber, the second processing section, and the curing processing unit are configured so that the pressures therein can be reduced such that the pressure in the second processing section is set to be lower than the pressure in the carrier chamber and the pressure in the curing processing unit is set to be lower than the pressure in the second processing section" being characteristics of the present invention to create such effects is not disclosed at all in the cited references.

The references presented by the Office Action describe the point that the pressures in the curing processing unit, the second processing section, and the carrier chamber are reduced, but have no teaching about the relationship between the pressures in the three apparatuses. More specifically, in the references presented by the Office Action have no description about the point that those three apparatuses are provided together in association with each other. Therefore, as a matter of course, the references have no teaching about establishment of the relationship between the pressures in those three apparatuses if they are provided.

Accordingly, there is no doubt that the present invention is both novel and nonobvious from the cited references.

As a matter of course, the above-described characteristics of the present invention are not described in Zhao et al.

About claims 20, 21, 23, 24, 27, 28 and 29

Each of these claims has the characteristics of and depend from claim 19. Accordingly, these claims have novelty and are non-obviousness over the applied art.

About new claim 31

In the present invention, the curing processing unit includes an electron beam tube for generating plasma, and an Ar gas is introduced into the curing processing unit. Therefore, according to the present invention, it is possible that the substrate which has been charged up by the irradiation with electron beams in curing is placed in the curing processing unit as it is so that plasma is generated to lower the potential of the substrate to thereby prevent damage due to the charge-up.

Such point is not disclosed at all in the references presented by the Office Action. Accordingly, this claim has novelty and is non-obviousness over the applied art.

About new claim 32

In the present invention, the curing processing unit includes an antenna for generating plasma by a high frequency from a high-frequency power source, and an Ar gas is introduced into the curing processing unit. Therefore, according to the present invention, it is possible that the substrate which has been charged up by the irradiation with electron beams in curing is placed in the curing processing unit as it is so that plasma is generated to lower the potential of the substrate to thereby prevent damage due to the charge-up.

Such point is not disclosed at all in the references presented by the Office Action. The Office Action determined that Livesay describes the grid electrode, but that electrode is completely different in purpose, configuration, and operation and effect from the antenna employed in the present invention which generates plasma by a high frequency from a high-frequency power source. The grid electrode in Livesay cannot generate plasma.

Accordingly, the present invention has novelty and is non-obviousness over the applied art.

Further, Applicants assert that there are also reasons other than those set forth above why the pending claims are patentable. Applicants hereby reserve the right to submit those other reasons and to argue for the patentability of claims not explicitly addressed herein in future papers.

In view of the foregoing, reconsideration of the application and allowance of the

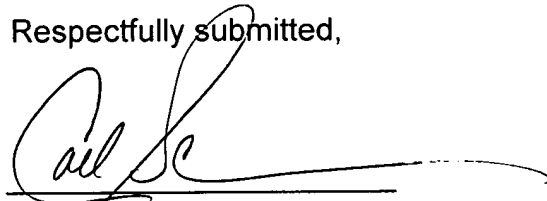
pending claims are respectfully requested. Should the Examiner believe anything further is desirable in order to place the application in even better condition for allowance, the Examiner is invited to contact Applicants' representative at the telephone number listed below.

Should additional fees be necessary in connection with the filing of this paper or if a Petition for Extension of Time is required for timely acceptance of the same, the Commissioner is hereby authorized to charge Deposit Account No. 18-0013 for any such fees and Applicant(s) hereby petition for such extension of time.

Respectfully submitted,

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Enclosure(s): Amendment Transmittal
 Petition for Extension of Time (1 month)

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